

REMARKS

INTERVIEW SUMMARY

The Applicant thanks the Examiner for the Interview conducted on August 8, 2007. The interview was between Examiner Todd and the applicant's attorney, Craig G. Holmes. Pending Claim 1 that was rejected in the Office Action was discussed along with U.S. Patent No. 6,421,711 issued to *Blumenau*. In particular, the discussion focused on the following: the 102(e) rejection of Claim 1; the Applicant's proposed amendment to 1; comparison of "the gateway device" of Claim 1 to the "gatekeeper" of *Blumenau*; and the Examiner's helpful suggestions regarding additional claim amendments. While the Interview was very helpful to the Applicant in understanding the Examiner's interpretation of Claim 1 and *Blumenau*, no agreement was reached. The Applicant is providing herein the amendment that was proposed during the interview, along with the claim amendments resulting from the Examiner's suggestions. In addition, the other independent claims that are currently pending in the Application were amended consistent with the amendments to Claim 1.

SPECIFICATION

In the specification, several paragraphs have been amended to correct label numbers and labels to correspond to the label numbers and labels used in the drawings or to change label numbers to avoid possible confusion that might result from using the same label number for different elements in different drawings. All of the changes to the specification are fully supported by the Application as filed, and no new matter is added.

The paragraph on page 25, line 21 to page 26, line 3 has been amended to: (1) change the label number for the "storage gateway" from "306A" to "306" to match FIG. 3B and avoid confusion with the "storage gateways 306A, 306B, 306N" shown and discussed with reference to FIG. 4A; and (2) change the label number for the "storage area network" from "308A" to "308" to match FIG. 3B.

The paragraph on page 26, lines 16-19 has been amended to change the label number for the "storage gateway" from "306A" to "306" to match FIG. 3B and avoid confusion with the "storage gateways 306A, 306B, 306N" shown and discussed with reference to FIG. 4A.

The paragraph on page 31, lines 6-17 has been amended to: (1) change the label number for the “storage gateway” from “306A” to “306” to match FIG. 5A and to avoid confusion with the “storage gateways 306A, 306B, 306N” shown and discussed with reference to FIG. 4A; (2) change label number for the “storage manager server machine” from “324A” to “501” to match FIG. 5A, as amended herein, to avoid confusion with the use of label number “324A” for one of the “storage managers” of FIG. 4A; and (3) change the reference to “storage manager ~~324~~” to “storage manager 324” to match the terminology used in both FIG. 5B and the remainder of page 31 of the specification.

The paragraph on page 43, lines 9-13 has been amended to change label number for the “storage manager server machine” from “324A” to “501” to match FIG. 5A, as amended herein, to avoid confusion with the use of label number “324A” for one of the “storage managers” of FIG. 4A.

DRAWINGS

In amended FIG. 5A, several changes have been made to conform FIG. 5A with the description of FIG. 5A found in the specification in Section 3.3, and more specifically, with the paragraph on page 31, lines 6-17, as amended above. The Appendix includes a redlined annotated sheet highlighting the changes to FIG. 5A. All of the changes to FIG. 5A are fully supported by the Application as filed, and no new matter is added.

Block 320A for the control processor has been expanded to include two new elements – “502 computing services element” and “504 gateway hardware abstraction layer.” This is consistent with the description of FIG. 5A on page 31, in the paragraph as amended above, which states that “a control processor 320A comprises a computing services element 502...and a gateway hardware abstraction layer 504.” Furthermore, the added computing services element 502 is shown as being within farm manager 326 in the amended FIG. 5B because page 31 explains that “Computing services element 502 is a sub-system of a farm manager 326...”

Block 501 has been added for the “storage manager server machine” as described with respect to FIG. 5A on page 31 and positioned to include the originally included storage manager 324 because page 31, as amended above, explains that “storage manager 324 [is] in storage manager server machine 501.”

In addition, a “disk array control center 506” and a “device driver 508” are added to FIG. 5A within the “storage manager server machine 501” because as explained on page 31, as amended above, “Storage manager server machine 501 additionally comprises a disk array control center 506...and a device driver 508.”

Also, a network link “509” is added to FIG. 5A between “storage manager client 324C” and “storage manager 324” because as explained on page 31, as amended above, “Requests for storage management services are communicated from storage manager client 324C to storage manager 324 via network link 540-509.”

Finally, blocks 320B, 320C, 322, 306, 308, and 304D have been moved and repositioned within FIG. 5A to make room for the changes described above, but otherwise, these blocks are unchanged.

STATUS OF CLAIMS

Claims 1, 40, 50, 60, 63, and 66 have been amended.

No claims have been cancelled, added, or withdrawn herein. Note that Claims 3-6, 9, 13, 14, 16-39, 44, 48, 54, 58, were previously cancelled in prior amendments.

Claims 1, 2, 7, 8, 10-12, 15, 40-43, 45-47, 49-53, 55-57, and 59-68 are currently pending in the application.

SUMMARY OF THE REJECTIONS/OBJECTIONS

The specification has been objected to for allegedly failing to provide proper antecedent basis for the claimed subject matter, specifically the term “identify” in Claims 60, 63, and 66. Claims 1-2, 7-8, 10, 15, 40-43, 45, 49-53, and 59-68 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent Number 6,421,711 issued to Blumenau et al. (“*Blumenau*”). Claims 11-12, 46-47, and 56-57 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over *Blumenau* in view of U.S. Patent Number 6,620,109 issued to Ofer et al. (“*Ofer*”). The rejections are respectfully traversed.

RESPONSE TO THE REJECTIONS NOT BASED ON THE PRIOR ART

The Office Action states that the specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. Specifically, the Office Action states that

Claims 60, 63, and 66 have been amended to read “‘wherein the host processor does not identify’ (emphasis added), however, Applicant refers to the specification for support wherein the specification specifically only defines wherein the host processor does not determine or know, and as Applicant has replaced ‘know’ with ‘identify’, it is reasonable that such a terminology change is significant and not support.”

The amendments to dependent Claims 60, 63, and 66 that were made in the previous response filed with the latest RCE were to change the claim language from “does not know” to “does not *identify*.” This change was made because the corresponding independent Claims 1, 40, and 50, from which Claims 60, 63, and 66 depend, respectively, had been amended in that previous response to feature that “the host processor does not *know* which one or more logical units are associated with the host processor” (instead of “does not *determine*...”) Hence, as originally written before being amended in the previous response and amendment, Claims 60, 63, and 66 were redundant with respect to how Claims 1, 40, and 50 had been amended, and as a result, Claims 60, 63, and 66 were amended to read “does not identify” to be different from Claims 1, 40, and 50 that were amended to read “does not know.”

Given the objection to the specification made in the Office Action and the history of the language of Claims 1, 40, and 50 being previously amended from “does not determine” to “does not know,” the Applicant has amended Claims 60, 63, and 66 above to read “does not determine” instead of “does not identify.” As a result, the language of Claims 1, 40, and 50, which prior to the last amendment read “without determining” and of Claims 60, 63, and 66, which prior to the last amendment read “does not know,” are now reversed. As the claims currently stand as of the amendment herein, Claims 1, 40, and 50 currently read “without knowing” while Claims 60, 63, and 66 currently read “does not determine.”

The Applicant respectfully submits that Claims 60, 63, and 66 are fully supported by the Application, and no new matter is added. For example, the Application explains with reference to Figure 3 that the virtual storage layer 310 provides “storage virtualization from the perspective of hosts 302A... Each such host can obtain storage through virtual storage layer 310 **without determining** or knowing which specific storage unit 304A, 304B, 304N, etc., is providing the storage, and **without determining** or knowing which LUN, block,

volume, concatenated, or other sub-unit of a storage unit actually contains data..." that is used by the host processor. (Application, page 24, lines 20-24; Figure 3.)

As another example, the Application later explains that "control processor 312 can command storage gateways 306 and storage area networks 308 to associate a particular LUN of one or more of the storage units 304A, 304B, 304N, etc. with a particular virtual server farm, e.g., to a particular host 302A, 302B, 302N." (Application, page 24, lines 11-19.) As a result, "virtual storage layer 310 provides storage virtualization from the perspective of hosts 302A, etc. Each such host can obtain storage through virtual storage layer 310...**without determining** or knowing which LUN...of a storage unit actually contains data" for the hosts. (Application, page 24, lines 20-24.)

The Applicant respectfully submits that the amendments to Claims 60, 63, and 66 are explicitly supported by the Application and therefore traverse the objection to the specification raised in the Office Action.

RESPONSE TO THE REJECTIONS BASED ON THE PRIOR ART

A. CLAIM 1

(1) INTRODUCTION TO CLAIM 1

As amended above, Claim 1 features:

"A computer-implemented method of allocating storage to a *host processor*, comprising:
a control processor receiving a request to allocate storage to the *host processor*; and
the control processor associating one or more logical units from among one or more
storage units to the host processor by:
the control processor configuring a gateway device to map the one or more
logical units to the host processor, wherein the **gateway device is a physical device**;
the control processor configuring the one or more storage units to give the host
processor access to the one or more logical units;

wherein the host processor accesses the one or more logical units, which are associated with the host processor by the control processor, ***without the host processor knowing which of the one or more logical units*** from among the one or more storage units **are associated with the host processor**;

wherein the control processor is a ***separate device*** from each of the gateway device, the host processor, and the one or more storage units; and

wherein the gateway device is a ***separate device*** from each of the control processor, the host processor, and the one or more storage units.” (Emphasis added.)

Thus, Claim 1 features three changes – (1) that “the gateway device is a ***physical device***;” (2) that the “host processor accesses the one or more logical units...***without*** the host processor ***knowing*** which of the one or more logieal units ... are associated with the host processor;” and (3) that both the control processor and the gateway device are “***separate***” devices from each other and from both the host processor and the one or more storage units. As a result, the approach of Claim 1 for associating storage with the host processor features the gateway device is a physical device, that the host processor accesses the logical units without known which logical units are associated with the host processor, and that both the control processor and the gateway device are separate devices than each other as well as the host proccessor for which storage from the one or more storage units is being allocated.

(2) SUPPORT FOR AMENDMENTS TO CLAIM 1

Each of the three amendments to Claim 1 is fully supported by the Application as filed for the reasons given below. Therefore, the Applicant respectfully submits that no new matter is added.

(A) “THE GATEWAY DEVICE IS A PHYSICAL DEVICE”

The Application explains that the “gateway device” is a physical device. For example, the Application provides an example of a “gateway device,” namely a Pathlight gateway from Pathlight Technology, Inc. (See Application, page 20, lines 8-10; page 28, lines 1-3.)

As another example, in the embodiments illustrated in FIGs 3A, 3B, 5A, and 6A and described in the Application on pages 23-25 and 31-33, many physical devices are depicted and described, such as hosts 302A...302N, control processor 312, storage networks 308,

storage units 304A...304N, control processors 320A-320C, control database 322, storage manager 324, etc., as well as the storage “gateway” 306 being depicted as a physical device.

As other examples, in the embodiment illustrated in FIG. 2A, numerous physical devices are depicted, including network 202, firewall 204, load balancer 206, CPU's 208a-208c, storage area network 212, and storage units 214a-214b, as well as the storage area network “gateway” 210 is depicted as a physical device, and in the embodiment illustrated in FIGs. 4A and 4C and described in the application on pages 27-29, many physical devices are depicted and described, such as control databases 322A-322B, storage managers 324A-324B, network 401, disk arrays 404A-404B, DAS network 402, disk array controllers 406A-406B, data switches 414A-414N, as well as the plurality of gateways 306D, 306E, etc., being depicted as physical devices.

Note that while these figures and descriptions illustrate many components in the form of physical devices, the claims are not to be interpreted as limiting those components to being physical devices, with the exception of the “gateway device” that is stated to be a “physical device” in the amendments above.

Therefore, the Applicant respectfully submits that the amended feature of Claim 1 of “the gateway device is a physical device” is fully supported by the Application, and no new matter is added.

(B) “THE HOST PROCESSOR ACCESSES THE ONE OR MORE LOGICAL UNITS...WITHOUT KNOWING WHICH OF THE ONE OR MORE LOGICAL UNITS...ARE ASSOCIATED WITH THE HOST PROCESSOR”

The Application explains that “the host processor accesses the one or more logical units...without knowing which of the one or more logical units...are associated with the host processor.” For example, the Application states on page 24, line 20 – page 25, line 11 (emphasis added):

In this arrangement, virtual storage layer 310 provides storage virtualization from the perspective of hosts 302A, etc. Each such **host can obtain storage through virtual storage layer 310 without determining or knowing which specific storage unit 304A, 304B, 304N, etc., is providing the storage, and without determining or knowing which LUN, block, volume, concatenated , or other sub-unit of a storage unit actually contains data.**

The virtual storage layer 310 may be viewed as providing a virtual SCSI bus that maps or connects LUNs to hosts. In this context, virtual storage layer 310 appears to hosts 302A, 302B, 302N as a SCSI device, and is addressed and accessed as such. Similarly, virtual storage layer 310 appears to storage units 304A, 304B, 304N as a SCSI initiator.

The reason that the host processor does not know about the logical unit(s), or the associated LUN(s), that the host uses is explained in the Application, such as with reference to Figures 2A and 2C. Specifically, the storage area network gateway 210 receives logical unit numbers (LUNs) in block 230, and then the storage area network gateway 210 creates an internal mapping of the gateway's SCSI ports to the logical unit numbers. As a result, the gateway 210 can properly direct information storage and retrieval requests that arrive on the gateway's SCSI ports to the correct disk array and logical unit within a subsystem, based on the automatic allocation or assignment of storage to a particular CPU. (Application, page 22, lines 13-20.)

Similarly, the Application later explains that "control processor 312 can command storage gateways 306 and storage area networks 308 to associate a particular LUN of one or more of the storage units 304A, 304B, 304N, etc. with a particular virtual server farm, e.g., to a particular host 302A, 302B, 302N." (Application, page 24, lines 11-19.) As a result, "virtual storage layer 310 provides storage virtualization from the perspective of hosts 302A, etc. Each such host can obtain storage through virtual storage layer 310...without ... knowing which LUN...of a storage unit actually contains data" for the hosts. (Application, page 24, lines 20-24.)

The Applicant notes that this additional feature of Claim 1 is in the form of a "negative limitation" and is proper as described in MPEP §2173.05(i). Specifically, that section of the MPEP explains that despite some "older cases [that] were critical of negative limitations because they tended to define the invention in terms of what it was not, rather than pointing out the invention," the "current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation." MPEP §2173.05(i) then states that any

negative limitation must have basis in the original disclosure, which is the case herein regarding Claim 1 and the other claims with the same or similar features, as noted above in the explanation of support for these claim amendments and newly added claims.

Therefore, the Applicant respectfully submits that the amended feature of Claim 1 of “the host processor accesses the one or more logical units...without knowing which of the one or more logical units...are associated with the host processor” is fully supported by the Application, and no new matter is added.

(C) THE CONTROL PROCESSOR AND GATEWAY DEVICE ARE “SEPARATE” DEVICES

The Application explains that the control processor and gateway devices are “separate” devices from each other and from each of the host processor and the one or more storage units. For example, in the embodiments illustrated in FIGs. 3A, 3B, and 3C, control processors 312 and 320A-320N are depicted as *separate devices* from each of hosts 302A-302N, 302D, storage gateway 306, storage units 304A-304N, and disk arrays 304C, 304D. As another example, in the embodiments illustrated in FIGs. 3A and 3B, storage gateway 306 is depicted as a *separate device* from each of hosts 302A-302N, control processors 312 and 320A-320C, storage units 304A-304N, and disk array 304D.

Therefore, the Applicant respectfully submits that the amended feature of Claim 1 of “wherein the control processor is a *separate device* from each of the gateway device, the host processor, and the one or more storage units” and “wherein the gateway device is a *separate device* from each of the control processor, the host processor, and the one or more storage units” are fully supported by the Application, and no new matter is added.

(3) INTRODUCTORY DISCUSSION OF *BLUMENAU*

In contrast to the approach of Claim 1, *Blumenau* discloses an approach for modifying a storage unit referred to as a “cached storage subsystem” to allow for the use of virtual ports by hosts to access storage within the cached storage subsystem. Specifically, the cached storage subsystem 20 includes a storage controller 27 that further includes port adapters 35, 36 that are programmed to provide a plurality of virtual ports and a virtual switch, both of which are defined by software, for routing storage access requests from a physical port of the storage controller to the virtual ports. (Abstract; Figures 1, 21, and 22.) To partition the storage of

cached storage subsystem among different hosts, the virtual ports are assigned to each host and the storage volumes associated with each virtual port are made accessible from each host. (Abstract.)

Note that in the approach of *Blumenau*, even with the use of the virtual ports/virtual switch, the **host always must know** the LUNs that the host can access. For example, the **host either reads** the configuration information for the volumes accessible to the host that is stored on either the host or on the storage subsystem. (Col. 31, lines 15-17.) Specifically, *Blumenau* explains that the **host can read** the primary copy of the configuration information in the “gatekeeper” volume in the storage subsystem (Col. 32, lines 18-20), **or the host uses a mapping driver** at power up to send commands to the adapter ports **to obtain the LUN** information. (Col. 32, lines 22-28.) Either way, *Blumenau* clearly states that “**the host must** be programmed **to seek out the LUNs that it can access**” (Col. 32, lines 20-22), which means that **the host** in *Blumenau*’s approach **always must know which LUNs the host can access**.

(4) BLUMENAU FAILS TO DISCLOSE THE THREE AMENDED FEATURES OF CLAIM 1

For the reasons given below, the Applicant respectfully submits that each of the three amendments to Claim 1 are not disclosed, taught, suggested, or in any way obvious in light of the disclosure of *Blumenau*.

(A) BLUMENAU FAILS TO DISCLOSE THAT “THE GATEWAY DEVICE IS A PHYSICAL DEVICE”

In the rejection of Claim 1, the Office Action states that *Blumenau* discloses “the control processor configuring a gateway device to map the one or more logical units to the host processor (at least col. 32 line 13 – col. 33 line 17; allocated and assigning LUN, the control processor being a part of the gateway device/gatekeeper and configuring itself.” However, the Applicant respectfully submits that the “gateway device” featured in Claim 1 does not read on *Blumenau*’s “gatekeeper” because (1) *Blumenau*’s “gatekeeper” is a logical volume and therefore not a “physical device” and (2) *Blumenau*’s “gatekeeper,” being a logical volume, cannot include a “control processor” as alleged in the Office Action.

Specifically, *Blumenau* first describes the “gatekeeper” as “predefined **logical** volume, such as a volume accessed at LUN0, that functions as a gatekeeper device.” (Col. 31,

lines 23-26; emphasis added.) *Blumenau* consistently describes and refers to the “gatekeeper” as a logical volume, and often uses the more accurate phrase of “gatekeeper facility.” (See Col. 32, lines 19-20; Col. 33, lines 39-40 and 53; Col. 34, line 7 and 40; Col. 35, lines 37 and 53; Col. 36, line 23, *et seq.*) In fact, the Office Action acknowledges this definition of the “gatekeeper” being a logical volume in the “Response to Arguments” portion of the Office Action (see page 15, lines 3-4).

More significantly, in the depictions of the **hardware** arrangements in *Blumenau*’s figures, such as Figures 1-4, 21-22, and 32, the “gatekeeper” is never shown nor referred to with a label number within the text of *Blumenau*. This is consistent with the “gatekeeper” being a logical volume or facility of the storage subsystem.

In addition, *Blumenau*’s “gatekeeper” is defined to be a “logical volume” that is accessed at LUN0, and a logical volume cannot include a “control processor,” which is a physical device, not a logical device.

The Applicant does note that the introduction of the “gatekeeper” in Column 31 of *Blumenau* uses the inaccurate and misleading phrase “gatekeeper device.” However, this is the only occurrence in *Blumenau* of the “gatekeeper” being referred to as a “device,” and therefore *Blumenau*’s is using the word “device” in an abstract manner. Given the definition of the “gatekeeper” and the use and description of the “gatekeeper” elsewhere within *Blumenau*, the Applicant respectfully submits that the “gatekeeper” in *Blumenau* would be most reasonably understood to be a **logical** volume for controlling access, not an actual, physical hardware device such as a “gateway device” as in Claim 1.

In summary, while *Blumenau* discloses a “gatekeeper,” *Blumenau* explains that the “gatekeeper” is a logical volume, and therefore, the Applicant respectfully submits that *Blumenau* does not disclose “the control processor configuring a gateway device to map the one or more logical units to the host processor, wherein the **gateway device is a physical device**,” as featured in Claim 1.

(B) *BLUMENAU FAILS TO DISCLOSE “THE HOST PROCESSOR ACCESSES THE ONE OR MORE LOGICAL UNITS...WITHOUT KNOWING WHICH OF THE ONE OR MORE LOGICAL UNITS...ARE ASSOCIATED WITH THE HOST PROCESSOR”*

In the rejection of Claim 1, the Office Action states that *Blumenau* discloses “wherin the host processor does not know which one or more logical units are associated with the host processor (at least col. 32, lines 13-43; host obtaining LUNs associated with it.” In the “Response to Arguments” section, the Office Action explains that *Blumenau* “clearly states that the host must seek out the LUNS, thus there would be no need to seek out the LUNs if the LUNs were known prior; so, while the host eventually knows the LUNs, they are not known, as they must be sought after in the first place.”

The Applicant appreciates this additional clarification of the basis of this portion of the rejection of Claim 1, and in response, the Applicant has amended Claim 1 to remove this feature and instead add the feature that “**the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor.**”

As noted in the Offiee Action’s “Response to Arguments” section, with *Blumenau*’s states “the host **must be programmed to seek out the LUNs that it can access.**” (Col. 32, lines 20-22; emphasis addcd.) In particular, in Columns 31, 32, and the first portion of 33, *Blumenau* describes the “host involvement in volume configuration and mapping.” (Col. 31, lines 7-8.) First, *Blumenau* explains that “the configuration information for the volumes accessible to a host is kept in the storage subsystem and on the host. The host should be able to access the primary copy on the storage subsystem if the host’s local copy is not available.” (Col. 31, lines 19.) For example, “the configuration information is stored in a predefined logical volume, such as a volume accessed at LUN0, that functions as a gatekeeper device.” (Col. 31, lines 23-26.)

Blumenau also explains that even with the use of the “virtual ports” described therein and that are the focus of that reference, the *virtual ports are reported to the host along with the LUNS available to the host from each virtual port*, both of which are programmed into each of the port adapters that implement the virtual ports. (Col. 32, lines 13-18.) *Blumenau*

then explains an alternative in which instead of the hosts determining the LUNs via such routines, the host can read the primary copy of the configuration information stored in the “gatekeeper” volume of the storage subsystem. (Col. 32, lines 18-20.)

Then *Blumenau* states: “***In any case, the host must be programmed to seek out the LUNs that it can access,***” either by a mapping driver at startup that includes commands to obtain the LUN information from the adapter ports or by reading the primary copy of the configuration information in the storage subsystem. (Col. 32, lines 20-31; emphasis added.) Therefore, *Blumenau* not only fails to disclose that “**the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor**,” as in the approach of Claim 1, but *Blumenau* expressly teaches away from such a feature by stating that the host must seek out (or determine) the LUNs that the host can access.

The other portions of *Blumenau* mentioned above are consistent with Columns 31 and 32. Specifically in Columns 33 and 34, *Blumenau* explains how the host request logical volumes. (Col. 33, lines 27-28.) In particular, *Blumenau* describes the “mount” and “unmount” commands that are issued by the host controller to the port adapters, and each of these commands the LUNs. (Col. 33, lines 29-52.) The gatekeeper facility then responds to these commands and creates entries for the required mappings, which are reflected in the configuration information stored at the host and on the gatekeeper volume of the storage subsystem, either of which are accessed by the host controller, as described above. (Col. 33, line 53 – Col. 34, line 10.)

Likewise, in Column 9, *Blumenau* describes how the host obtains the LUN information. Specifically, *Blumenau* explains that the mapping of LUNs and logical volumes are “specified by or reported to a host,” such as through a “Report LUNs” command that is typically executed by the operating system of the host at “boot” time. (Col. 9, lines 18-43.)

Therefore, while *Blumenau*’s explanation that the host must seek out the LUNs indicates that the host does not know about the LUNs before seeking out that information, which is acknowledged by the Office Action, *Blumenau* is clear that “**the host must be programmed to seek out the LUNs that it can access,**” and therefore not only does

Blumenau fails to disclose that “**the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor**,” but *Blumenau* teaches away from this feature of Claim 1 by emphasizing that the host must know the LUNs that the host can access.

(C) **BLUMENAU FAILS TO DISCLOSE THAT THE CONTROL PROCESSOR AND GATEWAY DEVICE ARE “SEPARATE” DEVICES**

In the rejection of Claim 1, the Office Action states that *Blumenau* discloses “wherein the control processor is a **different device** from each of the gateway device, the host processor, and the one or more storage units” and “wherein the gateway device is a **different device** from each of the control processor, the host processor, and the one or more storage units,” citing at least Col. 42, lines 20-30 and Col. 31, lines 15-26.

However, during the Examiner Interview, the Examiner explained that whether devices are different versus the devices being the same is not as helpful as if the Claim 1 were to feature that the devices were separate devices. As a result, the Applicant has amended Claim 1 to be consistent with the Examiner’s suggestion so that Claim 1 features that the control processor and the gateway device are separate from each other and from each of the host processor and the one or more storage units, which the Applicant respectfully submits is not disclosed by *Blumenau*.

Specifically, in the first cited portion of *Blumenau*, the general requirements of the embodiments disclosed therein, including that “any number of storage subsystems” can be used and configured to provide host access to selected volumes and that “each entity in the data processing system (storage subsystem, data network, and host)” should have separate and distinct management interfaces.” (Col. 42, lines 20-30.) While this description of *Blumenau* can be interpreted as disclosing that the storage subsystem, data network, and host are separate from each other, this portion of *Blumenau* only discloses two types of devices that are akin to any of the devices of Claim 1 (e.g., *Blumenau*’s storage subsystem and host), while the third type of device (e.g., the data network) is not akin to any of the features included in Claim 1, and this cited portion of *Blumenau* omits anything akin to the “control processor” and “gateway device” of Claim 1.

Specifically *Blumenau's* "storage subsystem" and "host" could be interpreted as being akin to the "one or more storage units" and "host processor of Claim 1, but there is nothing in Claim 1 akin to the "data network." In addition, in Claim 1, there is not only a "host processor" and "one or more storage units," but there is also a "gateway device" and a "control processor." And as explained in detail above, *Blumenau* fails to disclose anything like Claim 1's "gateway device." Also, while the Office Action relies upon *Blumenau's* "gatekeeper" including a "control processor," as explained above, *Blumenau's* "gatekeeper" is a logical volume of the storage subsystem and therefore cannot include a control processor.

In addition, the description in *Blumenau* in Column 42 that there should be "separate and distinct management interfaces" for the three disclosed entities, namely the storage subsystem, the data network, and the host, is not the same thing as saying that there are four separate devices, as in Claim 1, little less that those four devices are separate from each other. Just because one particular interface can be used for more than one type of device, and a device may have more than one interface, there is no "one to one" correspondence between interfaces and devices, and in fact, *Blumenau's* explanation that there should be such a "one to one" correspondence for the three devices mentioned implies that there are other variations.

In addition, in the second cited portion of *Blumenau*, there is a description of where the "configuration information" for volumes accessible by the host is stored, noting that the configuration information is kept on both the storage subsystem and on the host. (Col. 31, lines 15-26.) In particular, *Blumenau* describes that "the configuration information is stored in a predefined logical volume, such as a volume accessed at LUN0, that functions as a gatekeeper device." (Col. 31, lines 23-26.) While this portion of *Blumenau* can be interpreted as disclosing that the host and storage subsystem are separate, there is again a lack of any disclosure of a "gateway device" or a "control processor," as in Claim 1. In fact, when *Blumenau* explains that the "gatekeeper" is a logical volume, it would be most reasonably understood that the "gatekeeper" is in fact part of the storage system, therefore *Blumenau's* "gatekeeper" is not separate from the storage subsystem. In fact, in order to operate to control access to different LUNs by different hosts, *Blumenau's* "gatekeeper" needs to be part of the storage system, not separate from the storage subsystem.

Next, the Applicant notes that the “Response to Arguments” section of the Office Action states: “a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.” The Applicant respectfully submits that there is a structural difference between the approach of Claim 1 and *Blumenau* and that *Blumenau*’s structure is not capable of performing that intended use.

Specifically, the approach of Claim 1 involves four separate devices: the host processor; the control processor; the gateway device; and the one or more storage units. Claim 1 also features both “the control processor configuring the gateway device to map the one or more logical units to the host processor” and “the control processor configuring the one or more storage units to give the host processor access to the one or more logical units” with the intended use being “the host processor accesses the one or more logical units...without the host processor knowing which of the one or more logical units from among the one or more storage units are associated with the host processor.”

However, as explained in detail above, in *Blumenau*’s approach, the host must seek out the LUNs that the host can access. As a result, there is a structural difference between the approach of Claim 1 and *Blumenau*, namely that the “gateway device” (which is a “physical device” and separate from the storage units in Claim 1, whereas *Blumenau*’s gatekeeper is a logical volume and therefore is necessarily a part of *Blumenau*’s storage subsystem. And *Blumenau*’s structure is not capable of providing the same intended use, namely of “the host processor accesses the one or more logical units...without the host processor knowing which of the one or more logical units from among the one or more storage units are associated with the host processor,” because the host in *Blumenau* must seek out the LUNs that it can access.

Note that this fundamental difference between the approach of Claim 1 and *Blumenau* is due to the differences in what is being “virtualized” because in Claim 1, it is the storage layer, whereas in *Blumenau*, it is the ports in the port adapter within the storage controller within the cached storage subsystem, which is explained more fully below.

Therefore, while *Blumenau* discloses a host and a storage subsystem that can be separate from each other, *Blumenau*’s “gatekeeper” is a logical volume that is part of the

cached storage subsystem and nothing else in *Blumenau* corresponds to a separate “control processor” that configures both a physical “gateway device” and storage units, as in Claim 1. Thus, the Applicant respectfully submits that *Blumenau* fails to disclose that “the control processor is a **separate device** from each of the gateway device, the host processor, and the one or more storage units” and “the gateway device is a **separate device** from each of the control processor, the host processor, and the one or more storage unit,” as in Claim 1.

(5) BLUMENAU IS VIRTUALIZING “PORTS” WHEREAS CLAIM 1 IS VIRTUALIZING THE STORAGE LAYER

While the Applicant’s claims plus Application and the prior art of *Blumenau* are both using the concept of “virtualization” in regards to storage systems, which in both involves some sort of a mapping of something “virtual” to something “physical,” the approaches of *Blumenau* and Claim 1 are fundamentally different and operate at different “levels” of a storage system. Specifically, *Blumenau* is virtualizing ports within a storage controller, so *Blumenau* is operating inside of the storage subsystem, whereas Claim 1 is virtualizing the storage layer and therefore is operating outside of storage system.

Specifically, in the Applicant’s claims and specification, the virtualization is of the “storage layer,” such as virtual storage layer 310 of FIG. 3A, which includes storage gateway 306 and storage networks 308, through which hosts 302A, etc., access storage units 304A, etc. Through the use of storage gateway devices, the hosts can access storage without knowing which logical or physical storage units are being accessed. This approach addresses the prior art limitations of not being able to dynamically or automatically add and remove storage from a particular host or server without having to require that the host be rebooted so that its operating system becomes aware of the changed storage configuration. (See Background, pages 3-4 of the Application). As a result, the host processor in the approach of Claim 1 accesses storage without the knowledge of which logical units are being accessed, as the lack of that knowledge is made up for by the gateway device that associates the LUNs with the appropriate hosts and storage units. Thus, the gateway device is performing a physical switching function to connect hosts with storage, but the gateway device is doing so at the direction of the control processor and what the gateway device is doing is hidden from the

hosts. As a result, from the viewpoint of the hosts, the storage layer is a “virtual storage layer”, the detailed organization and operation of which is not known to the hosts.

In contrast, *Blumenau* is virtualizing ports and routing storage requests with a virtual switch within the storage controller, with virtual ports being assigned to hosts and the set of storage volumes being accessible from each virtual port. (Abstract; Figure 21.) *Blumenau* is addressing the problem of having to physically switch links to the network ports of the hosts to ensure that a host is restricted to accessing a limited number of logical volumes, thereby ensuring security so that other hosts are not able to access logical volumes of others when using a consolidated storage subsystem without the use of high-level authentication and authorization procedures. (Col. 1, lines 40-45, 59-67; Col. 2, lines 1-31.) Thus, a host in *Blumenau*’s approach uses a port address as normal, although the port address being used is that of a virtual port that is later mapped to a physical port. Yet even with the use of such virtual ports, *Blumenau*’s approach requires that the host know the logical units are being accessed by the host. As a result, from the viewpoint of the hosts, the port adapter is virtualized by having a “virtual switch” and “virtual ports,” but that virtualization is occurring within the storage controller.

In addition, in *Blumenau*’s approach, the mapping or “virtual switching” is not occurring in hardware, but rather in software through the use of the virtual ports and a virtual switch, such as virtual ports 240, 241 and virtual switches 238, 239 of Figure 21. This is because the “virtual switches” in *Blumenau* are just logical objects, not physical, to describe the operation of the microprocessor in handling Fibre Channel requests. (Col. 23, line 60 – Col. 24, line 3.) In contrast, the approach of Claim 1 uses a “gateway device” that is a physical device that is configured by a separate control processor.

Thus, the nature of what is being virtualized in *Blumenau*, namely the ports within a port adapter of a storage controller, and what is being virtualized in Claim 1, namely the storage layer, illustrates why *Blumenau* fails to disclose not only the physical gateway device of Claim 1, but also that a host processor accesses logical units of storage without knowing which logical units are associated with the host processor and that the gateway device and the control processor are separate devices from each other and the host and storage units.

**(6) DETAILED DISCUSSION OF THE FINAL OFFICE ACTION'S CITATIONS FROM
BLUMENAU IN THE REJECTION OF CLAIM 60 WITH RESPECT TO THE HOST PROCESSOR NOT
IDENTIFYING WHICH LOGICAL UNITS ARE ASSOCIATED WITH THE HOST PROCESSOR**

Since Claim 60 was previously amended to feature that “the host processor does not *identify* which one or more logical units are associated with the host processor,” and although the amendment above changes Claim 60 to read that “the host processor does not *determine* which one or more logical units are associated with the host processor,” the basis of the rejection of Claim 60 is still relevant to the rejection of Claim 1 and different portions of *Blumenau* are cited in the rejection of Claim 60, and therefore is addressed herein.

In the rejection of Claim 60, the Final Office Action states that *Blumenau* discloses “the host processor does not identify which one or more logical units are associated with the host processor (at least col. 11 line 57 – col. 12 line 31; restrict volumes seen (“known”) by any one host.” While the cited portion of *Blumenau* does explain that “it may be desirable to restrict the set of volumes that can be seen by any one host,” (Col. 12, lines 1-2,) this has nothing to do with whether the host processor “knows,” “identifies,” or “determines” which logical units are associated with the host processor. Rather, Claim 1 features the **host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor.**” Thus, in Claim 1, the host processor does not know which logical units are associated **with itself** when the host processor is accessing those logical units, which is quite different from *Blumenau* explaining that it is desirable to restrict the volumes seen by any one host, which is a form of security or access control.

In particular, *Blumenau* expounds upon the statement about it being desirable to restrict the set of volumes seen by any one host as follows:

“Certain ‘private’ volumes should be assigned to each host and other hosts should not be permitted to see or modify the private **volumes of other hosts**. Moreover, the ‘boot’ process for a host is slowed down by searching for and reporting all the volumes to which the host has access. Certain operating systems are limited by the number of devices that they can handle at any given time, and for a host using such an operating system, it is not only desirable but

also necessary ***to limit the number of volumes that the host can access.***"
(Col. 12, lines 2-11; emphasis added.)

The additional citation to Column 12 merely explains how the volumes seen by any one host can be restricted, such as by using named groups and/or virtual ports. (Col. 12, lines 12-31.)

When this is read in conjunction with the earlier discussed portions of *Blumenau* that clearly state that "**the host must be programmed to seek out the LUNs that it can access,**" (Col. 32, lines 20-31; emphasis added), the discussion of Columns 11 and 12 of *Blumenau* would be clearly understood to mean that a particular host in *Blumenau* must always know which logical units and LUNs that that particular host can access, but that for other volumes of *other hosts*, the particular host need not know of those volumes. Thus, contrary to the assertion in the rejection of Claim 60 of the Office Action, the Applicant respectfully submits that this cited disclosure of *Blumenau* does not disclose that "**the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor,**" as in Claim 1." The Applicant also notes that the Office Action itself recognizes and acknowledges that the host knows which LUNs it is able to access. (See Response to Arguments, page 14.)

An additional review of *Blumenau* has failed to identify any other portion of *Blumenau* that discloses that a particular host in *Blumenau*'s approach does not know which logical units or LUNs are associated with that particular host when the host is accessing those logical units that are associated with the host. Furthermore, if there were such a disclosure in *Blumenau*, then such a disclosure would contradict the description of how *Blumenau*'s approach works, which requires that "**the host must be programmed to seek out the LUNs that it can access.**" (Col. 32, lines 20-31; emphasis added.) Thus, the Applicant respectfully submits that not only does *Blumenau* fail to disclose that "the host processor does not know which one or more logical units are associated with the host processor," but *Blumenau* expressly teaches away from this feature of Claim 1 by stating that "**the host must be programmed to seek out the LUNs that it can access.**" (Col. 32, lines 20-31; emphasis added.)

(7) DISCUSSION OF CLAIM 1 AND OFER

Although not relied upon in the rejection of Claim 1 or any of the other independent claims, nor most of the dependent claims, the Applicant is including this new subsection in this reply in response to the issue raised in the Office Action mailed on June 29, 2006, so as to preclude the issuance of another similar Office Action in the future.

In contrast to the approach of Claim 1, *Ofer* discloses an approach for providing very large logical volumes in a storage system that span several physical volumes. (*Ofer*, Title, Abstract.) In particular, *Ofer* describes concatenating together request queues in a host controller to produce the larger logical volume that appears to the host as a single addressable unit. (*Ofer*, Abstract.) When I/O requests to the large logical volume are received, the host controller analyzes the I/O requests to determine which logical devices within the large logical volume are actually needed to service the request, and then the host controller makes the appropriate queue entries for those identified logical devices. (*Ofer*, Abstract.) Thus, as *Ofer* describes, this “allows the disk controllers and memory operate without modification,” and as a result, only the “host controllers” of the storage system need be modified. (*Ofer*, Abstract.)

Thus, *Ofer* is only addresses to the concatenation of individual logical volumes to create a large/larger logical volume, which *Ofer* refers to as a “Meta Device.” (*Ofer*, Abstract.) As a result, *Ofer* is silent as to “host processors” as in the approach of Claim 1, little less the use of a gateway device that is configured to map logical units to the host processor, little less the host processor accessing logical units without knowing which logical units are associated with the host processor or that the control processor and the gateway device are different devices, as in the approach of Claim 1.

(8) CONCLUSION OF DISCUSSION OF CLAIM 1 AND BLUMENAU AND OFER

Because both *Blumenau* and *Ofer*, either alone or in combination, fail to disclose, teach, suggest, or in any way render obvious any of: (1) “the control processor configuring a gateway device to map the one or more logical units to the host processor, wherein the gateway device is a *physical* device;” (2) “the host processor accesses the one or more logical units, which are associated with the host processor by the control processor, **without** the host processor *knowing* which of the one or more logical units from among the one or

more storage units **are associated with the host processor;**” and (3) “wherein the control processor is a **separate device** from each of the gateway device, the host processor, and the one or more storage units” and “wherein the gateway device is a **separate device** from each of the control processor, the host processor, and the one or more storage units;” the Applicant respectfully submits that, for at least the reasons stated above, Claim 1 is allowable over the art of record and is in condition for allowance.

Furthermore because *Blumenau* expressly teaches away from the feature of “**the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor**” when *Blumenau* states “**the host must be programmed to seek out the LUNs that it can access**” (Col. 32, lines 20-22; emphasis added), the Applicant respectfully submits that, for at least the reasons stated above, Claim 1 is allowable over the art of record and is in condition for allowance.

B. CLAIMS 40 AND 50

Claims 40 and 50 contain features that are the same as those described above with respect to Claim 1.

In particular, Claims 40 features (1) “the control processor configuring a gateway device to map the one or more logical units to the host processor, wherein the **gateway device is a physical device;**” (2) “**the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor;**” and (3) “wherein the control processor is a **separate device** from each of the gateway device, the host processor, and the one or more storage units” and “wherein the gateway device is a **separate device** from each of the control processor, the host processor, and the one or more storage units;” which are the same as in Claim 1.

Also, Claim 50 features (1) an “apparatus comprising a control processor that is configured to carry out the steps of...configuring a gateway device to map the one or more logical units to the host processor, wherein the gateway device is a physical device;” (2)

wherin **the host processor accesses the one or more logical units**, which are associated with the host processor by the control processor, **without the host processor knowing which of the one or more logical units** from among the one or more storage units **are associated with the host processor**; and (3) “wherin the control processor is a *separate* device from each of the gateway device, the host processor, and the one or more storage units” and “wherin the gateway device is a *separate* device from each of the control processor, the host processor, and the one or more storage units;” which are either similar to or the same as Claim 1.

Therefore, based on at least the reasons stated above with respect to Claim 1, the Applicant respectfully submits that Claims 40 and 50 are allowable over the art of record and are in condition for allowance.

C. CLAIMS 2, 7, 8, 10-12, 15, 41-43, 45-47, 49, 51-53, 55-57, AND 59-68

Claims 2, 7, 8, 10-12, 15 and 60-62 are dependent upon Claim 1, Claims 41-43, 45-47, 49, and 63-65 are dependent upon Claim 40, and Claims 51-53, 55-57, 59, and 66-68 are dependent upon Claim 50, and thus include each and every feature of the corresponding independent claims. Therefore, the Applicant respectfully submits that each of Claims 2, 7, 8, 10-12, 15, 41-43, 45-47, 49, 51-53, 55-57, and 59-68 is allowable for the reasons given above for Claims 1, 40, and 50.

In addition, each of Claims 2, 7, 8, 10-12, 15 and 60-62 are dependent upon Claim 1, Claims 41-43, 45-47, 49, and 63-65 introduces one or more additional limitations that independently render it patentable. However, due to the fundamental differences already identified, to expedite the positive resolution of this case a separate discussion of those limitations is not included at this time, with the exception of a small number of dependent claims that are addressed below. Therefore, it is respectfully submitted that Claims 2, 7, 8, 10-12, 15, 41-43, 45-47, 49, 51-53, 55-57, and 59-68 are allowable for the reasons given above with respect to Claims 1, 40, and 50.

D. CLAIMS 60, 63, AND 66

(1) SUPPORT FOR AMENDMENTS TO CLAIMS 60, 63, AND 66

Claims 60, 63, and 66, as amended above, now feature that “the host processor does **not determine** which one or more logical units are associated with the host processor.” The amendments to Claims 60, 63, and 66 are fully supported by the specification, and no new matter is added.

For example, the Application explains with reference to Figure 3 that the virtual storage layer 310 provides “storage virtualization from the perspective of hosts 302A...**Each such host can obtain storage** through virtual storage layer 310 **without determining** or knowing which specific storage unit 304A, 304B, 304N, etc., is providing the storage, and **without determining** or knowing **which LUN, block, volume, concatenated, or other sub-unit of a storage unit actually contains data...**” that is used by the host processor.

(Application, page 24, lines 20-24; Figure 3.)

As another example, the Application later explains that “control processor 312 can command storage gateways 306 and storage area networks 308 to associate a particular LUN of one or more of the storage units 304A, 304B, 304N, etc. with a particular virtual server farm, e.g., to a particular host 302A, 302B, 302N.” (Application, page 24, lines 11-19.) As a result, “virtual storage layer 310 *provides storage virtualization from the perspective of hosts 302A, etc.* Each such host can obtain storage through virtual storage layer 310...**without determining** or knowing which LUN...of a storage unit actually contains data” for the hosts. (Application, page 24, lines 20-24.)

Thus, the Applicant, in amending Claims 60, 63, and 66 to feature that the host does not “determine” the logical units that are associated with the host, even given that those logical units must be associated with the host by some device in some way, intends to address the Office Action’s interpretation of “determining” to mean the mapping of hosts to logical units. Of course, in the approach of the claims of course, logical units are still mapped to host processors, but that information is held by the gateway device and yet is still not subsequently identified by the host processor in the approach of Claims 60, 63, and 66. This is in contrast to the approach of *Blumenau* in which such a mapping is also not determined by the host, yet

nevertheless “the host **must be programmed to seek out** [e.g., identify] the LUNs that it **can access**” (Col. 32, lines 20-22; emphasis added).

(2) THE AMENDMENTS TO CLAIMS 60, 63, AND 66 NARROW THE CORRESPONDING
INDEPENDENT CLAIMS 1, 40, AND 50

As amended above, Claims 60, 63, and 66 each feature that “the host processor does not determine which one or more logical units are associated with the host processor,” as compared to Claims 1, 40, and 50 that each feature that “the host processor accesses the one or more logical units...without the host processor knowing which of the one or more logical units...are associated with the host processor.” Thus, in Claims 60, 63, and 66, not only does the host processor does not know the logical units that are associated with the host processor when the host processor accesses the logical units (e.g., that another entity tracks that knowledge, such as the gateway device), but the host processor also does not “determine” which logical units are associated with the host processor (assuming that the logical units are determined by an entity other than the host processor).

Note that during the Examiner Interview, it was discussed that “without knowing” as in Claim 1 is narrower than Claim 1 reading instead “without determining” because with “without knowing” as in Claim 1, the lack of knowledge by the host processor is when the host processor is accessing the logical units, whereas if Claim 1 were to read instead “without determining,” the logical units could be determined by another device with that information transferred to the host processor, thereby enabling the host processor to know which logical units are associated with the host processor.

Now, in comparing Claims 60, 63, and 66 as amended herein to feature that “the host processor does not determine which one or more logical units are associated with the host processor,” one might initially view Claims 60, 63, and 66 as not further limiting Claim 1, but this is not the case. In Claim 1, the lack of knowledge of the logical units by the host processor is during a specific step or function, namely when the host processor accesses those logical units. In contrast, in Claims 60, 63, and 66, the feature that “the host processor does not determine the logical units that are associated with the host” is not limited to when the host processor is accessing the logical units.

Thus, Claim 1 does not limit the host processor in being able to determine the logical units associated with the host processor, so long as that knowledge is not held during the time that the host processor accesses the logical units (e.g., the host processor could determine the logical units before accessing them and then remove that knowledge prior to accessing the logical units, or the host processor could determine the logical units after accessing them). In contrast, in Claims 60, 63, and 66, the host processor does not determine the logical units associated with the host processor, and that lack of determination is not limited to just when the host processor is accessing the logical units. Therefore, the Applicant respectfully submits that dependent Claims 60, 63, and 66 do in fact further limit independent Claims 1, 40, and 50, respectively.

CONCLUSION

The Applicant believes that all issues raised in the Office Action have been addressed and that allowance of the pending claims is appropriate. After entry of the amendments, further examination on the merits is respectfully requested.

The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.

For the reasons set forth above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a formal Notice of Allowance is believed next in order, and that action is most earnestly solicited.

To the extent necessary to make this reply timely filed, the Applicant petitions for an extension of time under 37 C.F.R. § 1.136.

If any applicable fee is missing or insufficient, throughout the pendency of this application, the Commissioner is hereby authorized to any applicable fees and to credit any overpayments to our Deposit Account No. 50-1302.

Respectfully submitted,

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Appendix

APPENDIX

FOR DRAWING

AMENDMENT

For FIG. 5A with an
“Annotated Sheet”
Showing Changes

Fig. 5A

